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Study to Elevator inspection market in Deyang city, China



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TURUN AMMATTIKORKEAKOULU THESIS

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The purpose of this thesis is to describe and identify the characteristic of elevator inspection market in Deyang city, Sichuan province, China. To describe the market by using PEST analysis, which stands for P(political), E(economy), S(social), T(technology). In order to indentify the characteristic of elevator inspection market in Deyang city, interviewing methods will be applied in this thesis to collect primary data.

Scattered distribution of elevator owner is the first characteristic of elevator inspection market; it means that anyone who owns the elevator is the customer. Among various kinds of owners, the most elevators which are in use can be found in large companies. By collecting one hundred and twenty samples, the result shows company owners own the largest number of elevator in Deyang city.

This thesis helps to understand elevator inspection market in Deyang, but it is still lack of deeply and precisely analysis in term of economic environment, cost analysis and the opening information about elevator inspection market.

Keyword

Elevator, Market, Characteristic, Government control

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1. Introduction

1.1 Background

In 2010, I went back to my home country to do an internship in Quality inspection Bureau at DeYang city, Sichuan Province, China. I was sent to the Elevator inspection office as a management assistant. My work was actually quite easy in the elevator inspection office in the beginning. My work was management assistant in the first period and inspection member in the second period during the work, at first; I just did what I was told. Several days later, I started to join the real inspection process step by step.

According to Guide to Deyang Quality inspection Bureau, the elevator inspection market is supervised by the Quality inspection Bureau which is one of the important parts of Deyang city government. All elevator owners must apply for inspection service through Quality inspection Bureau.

As China started to open the market since 1979, it partly opened the domestic market including the elevator inspection market to the world. And the elevator inspection market is run by the Quality inspection Bureau of government until now. So I made one hypothesis:

- ◆ The elevator inspection market will open in the future, which means government will quit the running of elevator inspection market and makes elevator inspection market a free enter market to businessman all over the world. Neither I can say a exactly date of opening, nor I can predict it. But there is possibility that it will open within ten years. I will wait for it until it opens.

Therefore, I decide to make a study to help me better understand this market, prepared for this market will open. I have enough information and knowledge about this market which enables me quickly start my own business in Deyang, China when it opens. I learned a lot about elevator inspection during my work placement in Deyang Quality inspection bureau.

1.2 Objectives

For a future use, I want to explore this market and establish a business on this market. So the objectives of the report are helping me to identify market opportunities and some characteristics of this market. The first characteristic is largest number of elevator owner is company. The second characteristic is company owner owns the largest number of elevator. The third characteristic is Manufactory Company owns the largest number of elevator. The purpose of this report is to make me understand the elevator inspection market and identify the characteristics of elevator inspection market which supervised and run by the Chinese government in Deyang city. The aim is to find out

- ◆ What is special equipment?
- ◆ What is elevator inspection and inspection process?
- ◆ How Quality Inspection Bureau run this market in Deyang?
- ◆ What are the characteristics of it?

The results of these objectives enable me to understand this market in Deyang city. The characteristics provide me information which helps me avoid some potential risks in the future.

1.3 Key concepts

1.3.1 Deyang city

Deyang located in the northeast of Sichuan Province, China. It is the base of Chinese important technical equipment manufacturing (e.g. Dongfang Electrical machinery plant) . It stands for the top of manufacturer industry.

Year	Area(km)	Population(million))	GDP(Yuan/billion)
2009	5818	388	92.31
2011	5818	361	112.00

(baike.baidu.com, referred to 2012, 03 03)

The annual growth rate of GDP is almost 15% in 2011 compare to the 2009. Primary industry achieves 4.1% growth, secondary industry and tertiary-industry achieves 18.3% and 11.3% growth in 2011. (baidu.com 2009)

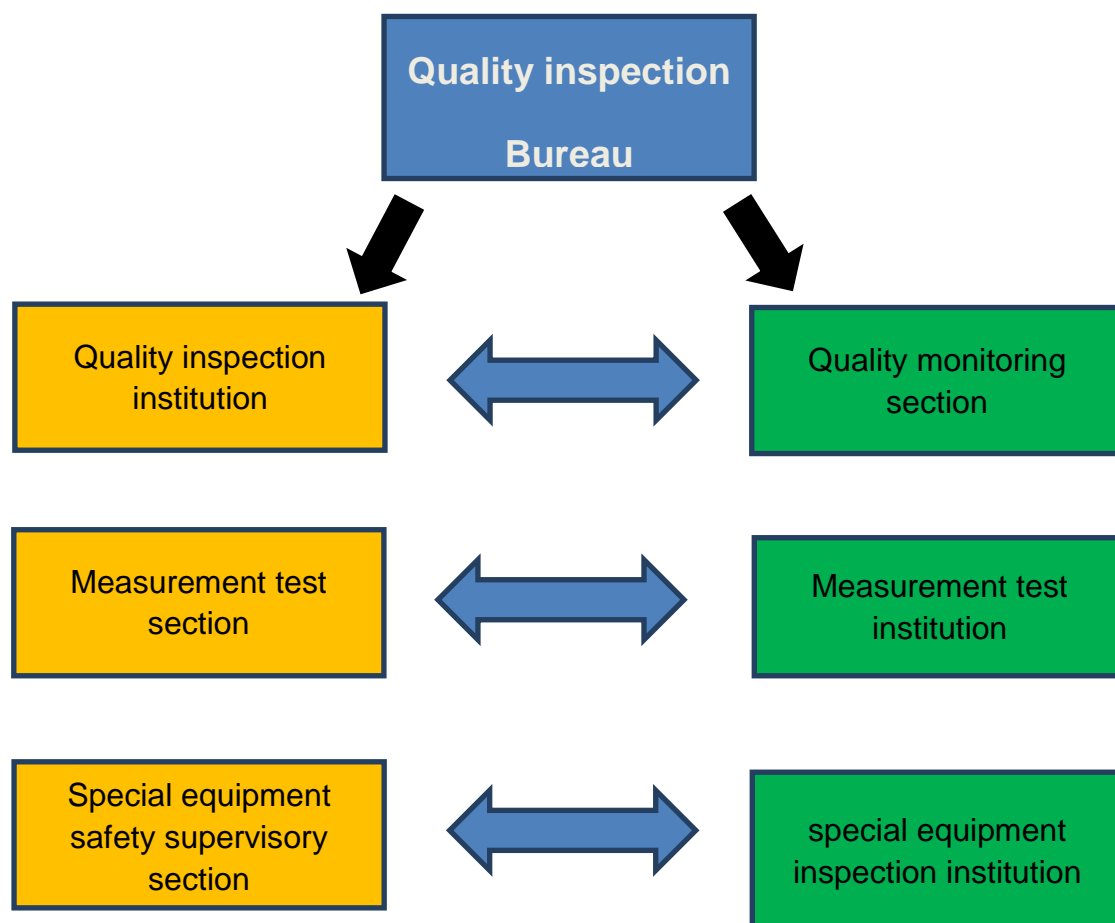
1.3.2 Quality inspection Bureau (Elevator inspection office)

1.3.2.1 Basic picture of organizational structure

The Deyang Quality inspection Bureau was established in 1983, it is part of Deyang government. It consists of an office center, a personnel section, and a finance section, a quality monitoring section, a standardization section, a

measurement test section, a special equipment safety supervisory section, a food production supervision section, a propaganda section and a committee. The Quality inspection Bureau also consists of four institution (business units), They are quality inspection institution, measurement test institution, special equipment inspection institution and fiber inspection institution. The section and the institution are on the same political status.

Table 1. Organizational structure of Quality inspection Bureau



(Big blue arrow means Parallel relationship which means they are in same political status; small black arrow means leader-member relationship)

(Z Liu, interview with the director of elevator inspection office, 14 May, 2012)

Usually, the customer apply for the elevator inspection service in the quality

monitoring section, and then quality monitoring section accept the application and inform the quality inspection institute. So the quality inspection institute sends the elevator checker and examiner to do the inspection.

In the special equipment institution, there are eight different offices. I worked in one of it called elevator inspection office. (Z Liu, interview with the director of elevator inspection office, 14 May, 2012)

The eight inspection offices are boiler inspection office, pressure vessel inspection office, pipeline inspection office, elevator inspection office, crane inspection office, in-plant vehicle inspection office; thrill rides inspection office and gas cylinder inspection office. Each office provides inspection for special equipment, for example, pressure vessel inspection office provides inspection for pressure vessel.

1.3.2.2 Function of Special equipment inspection section and institution (Elevator inspection office)

Special equipment inspection section's mainly responsible for organizing inspection of special equipment in Deyang city and registrations of special equipment. (Z Liu, interview with the director of elevator inspection office, 14 May, 2012)

Special equipment inspection institution's mainly responsible for supervisory and periodical inspection of special equipment in Deyang city.

1.3.2.3 Definition of special equipment

Special equipment consists of eight different equipment, they are risk of large

boiler, pressure vessel, and pressure pipe, elevator, lifting machinery, passenger ropeway, recreational facility and factory motor vehicle. Elevator is one of special equipment.

(Z Liu, interview with the director of elevator inspection office, 14 May, 2012)

2. Theory

The Theory be used in this thesis is PEST analysis.

PEST analysis is a useful tool when scanning the external environment , which stands for P(political), E(economic), S(social) and T(technology)(Anthony Henry., 2008,347) The PEST analysis is a valuable tool for people to understand market growth or decline (Robert J. Chapman, 2011,480) and also position, potential and direction for a business. (businessballs.com, online, 2012) This is the point that PEST analysis is suitable here in my thesis. it encourages systematic analysis of changing occurs in the environment.(, Steven P, 2005, 262) It is a very good tool for a people who want to get to know a market he does not know at all. PEST analysis and SWOT analysis are not very similar, usually it combines with the SWOT analysis.(Frances B, 1998, 188) .

Why I take PEST, not SWOT is because SWOT analysis is usually used to assess or measure a business unit or proportion, also SWOT analysis determines the current state of the market and outlines the challenges ahead, (Russell Kern, 2001, 277), while PEST analysis is mainly used to measure the market potential and situation. (businessballs.com, Online, 2012) in addition, PEST analysis is a way to evaluate the general business environment in order to manage the future opportunity. (Artur Gleyberman, 2010, 68) So in my

opinion, the PEST analysis will be more suitable in the analysis part of this thesis.

To answer the questions of this thesis, PEST analysis provide a desktop study model (Robert J. Chapman, 2011, 480) for me to find out information to answer the questions.

Table 2. PEST analysis

Political

- **ecological/environmental issues**
- **current legislation home market**
- **future legislation**
- **international legislation**
- **regulatory bodies and processes**
- **government policies**
- **government term and change**
- **trading policies**
- **funding, grants and initiatives**
- **home market lobbying/pressure groups**
- **international pressure groups**
- **wars and conflicts**

Economic

- **home economy situation**
- **home economy trends**
- **overseas economies and trends**
- **general taxation issues**
- **taxation specific to product/services**
- **seasonality/weather issues**
- **market and trade cycles**
- **specific industry factors**
- **market routes and distribution trends**
- **customer/end-user drivers**
- **interest and exchange rates**
- **international trade/monetary issues**

Social

- **lifestyle trends**
- **demographics**
- **consumer attitudes and opinions**
- **media views**
- **law changes affecting social factors**
- **brand, company, technology image**
- **consumer buying patterns**
- **fashion and role models**
- **major events and influences**
- **buying access and trends**
- **ethnic/religious factors**

Technological

- **competing technology development**
- **research funding**
- **associated/dependent technologies**
- **replacement technology/solutions**
- **maturity of technology**
- **manufacturing maturity and capacity**
- **information and communications**
- **consumer buying mechanisms/technology**
- **technology legislation**
- **innovation potential**
- **technology access, licencing, patents**

- **advertising and publicity**
- **ethical issues**
- intellectual property issues
- global communications

(businessball.com, 2012)

PEST is acronym that short from Political, Economic, Social and Technological.

(Robert J. Chapman, 2011, 480,)

Political	Economic	Social	Technological
-General legal requirement of elevator inspection office establishment	-Economy of Deyang city	-Customer attitude	-Dependent technology
-legal requirement of elevator inspection office Establishment	-Key customer	-Customer buying process	-Technology legislation
-working conditions	-market growth	-Life style trend	
-			

I just list the factor I will analysis in the following part in the form.

Political: It helps to analysis the legal requirement of elevator inspection market. Answer such questions like what kind of legislation is needed to establish an elevator inspection office? What kind of legal requirement is needed during elevator inspection? What is the future legislation? I found and

write these answers in the next chapter it helps me to understand the proper legislation and the proper legal document to establish my own elevator inspection office in the future. Not only about inspection, also about labor law and working conditions of people who are doing the inspections

Economic: It helps to analysis the home economic trend, market and the customer. Who are the target people or organizations is very important for the business. It helps me to understand the key customers to the business. Also, from the other side of economical thinking, it also reminds me to consider the cost of elevator inspection office establishment in the Deyang city and also whether this market is growing or not.

Social: It helps to analysis the consumer attitude, consumer buying patterns and lifestyle trend.

Technological: It helps to analysis the dependent technology, technology legislation, technology access. Elevator inspection market is a very technological dependent market. To understand the proper and compulsory technology is very important in the future plan concerning on the human resource recruitment and equipment purchase and licensing.

3. Methodology

The important part of this thesis is to decide what method to use to analyze and collect the data. In this thesis, I decide to use primary data analysis, secondary data analysis.

As I mentioned previously in the introduction part, I used to work for the elevator inspection office during the summer time in both 2010 and 2011. Through my internship in the elevator inspection office, I often made some small talks with my workmate in the office, and also I did some special consultation to my director in the office to get the information I needed in the thesis. Usually, my workmate explained my some basic information about the office, like the organizational structure of the office and the process of certification application. Most of information about elevator inspection including detail of supervisory inspection and periodical inspection were told by my office director, in addition, he gave me some right that enable me to access part of internal information like the income of the office, list of elevator owner in the Deyang city and elevator number of each elevator owner in the Deyang city.

In my first period of internship in elevator office which took place in July 2010, I worked as an assistant in the office and only worked for one month there. So for a new people in the office, I just was told to pick up telephones and to do some cleaning work. In my second period of internship in the elevator inspection office in July 2011, in three months of second period of internship I was promoted as a member of inspection unit and be able to access some basic information in the office. My work in the inspection unit was as a figure

recorder during the on-site inspection. It leads me to a closer touch to the elevator inspection. Idea of writing it into the thesis came to my mind but did not have a clear topic should be in thesis. I was starting to follow the process of elevator inspection and began to interview my workmate and my director during the second internship. So I cannot remember the whole small interviews I took during the internship, I did another structure interview on 14th of May 2012. The people I interviewed is director of elevator inspection office. it takes twenty-five minutes. The content of the interview attached in the reference part.

Secondary research occurs when a project requires a summary or collection of existing data. As opposed to data collected directly from respondents or "research subjects" for the express purposes of a project, (often called "empirical" or "primary research"), secondary sources already exist. (asiamarketresearch.com, referred to 2012, 03, 03)

It is hard to collect primary data by interview due to the strict supervision by government section. Therefore, secondary data is the most proper way to use in the thesis. So to prove the characteristics of this market, I choose to use the secondary data. I did my work placement in Chinese government section of Quality inspection Bureau; I tried to apply for the authorization of information from government internal statistics and internal database. After several complex step and form applications, I was allowed to access the database and recent government statistics. These secondary sources could include previous research reports, newspaper, magazine and journal content, and government and NGO statistics. (asiamarketresearch.com referred to 2012, 03, 03)

Also, to collect the existing information, reliable government statistics are more precisely and easier to get authorized by the government section in China

There are two main advantages of using secondary data in market research, they are time and cost savings..

- The secondary research process can be completed rapidly (generally in 2 to 3 week). Substantial useful secondary data can be collected in a matter of days by a skillful analyst.
- When secondary data is available, the researcher need only locate the source of the data and extract the required information.
- Secondary research is generally less expensive than primary research. The bulk of secondary research data gathering does not require the use of expensive, specialized, highly trained personnel.
- Secondary research expenses are incurred by the originator of the information.

(Business reference library, 2012)

4 Findings (PEST analysis)

4.1 Legal requirements to establish elevator inspection office

The legal requirements for establishing an elevator office are very complex. Nowadays, all these legal requirements are aimed at government-run institutes, which means only the government-run institutes are allowed to apply to establish an elevator inspection office, not to private organizations. And if these legislations will change or not in the future after opening the elevator inspection market to the private organization and company, it all depends on the government. The legal requirement of elevator inspection office establishment consists of two parts, the first one is general application requirement, and the second part is legal requirement of elevator inspection office as explained in the next sub section..

4.1.1 General establishment requirement and application process

Before establishing the special equipment inspection office, the candidate must have the list of qualifications below:

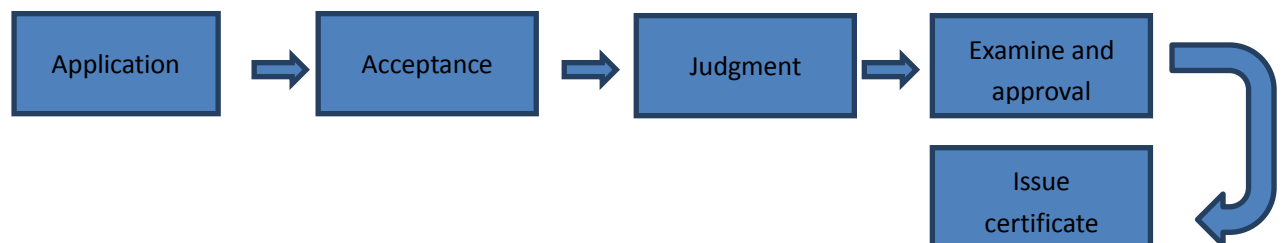
- ◆ An independent legal entity(person)
- ◆ Specific inspection staff, professional technical staff and technical person in charge of special equipment division must have special equipment inspector and above qualification
- ◆ Suitable space, equipment and testing means
- ◆ Sound quality management system and the effective implementation

(Accreditation criteria on special equipment inspection agencies TSG Z7001-2004, chapter 2, 2004, referred to 2012/03/12)

Only after owning all these qualifications, the candidates are able to apply for establish a special equipment inspection office. The candidate must file in an application form and submit the application form and other material which including original application form and electronic copy text, documentary evidence of independent legal entity and qualification of inspector certificate (Accreditation criteria on special equipment inspection agencies, chapter 3, No.9, 2004) to the local quality and technology supervision department at the provincial level or State Quality inspection Bureau.

There are five steps in the application process.

Table 3 Process of certificate



(Accreditation criteria on special equipment inspection agencies TSG Z7001-2004, Chapter 3, No.7, referred to 2012/03/12)

After submitting the application, candidate must wait for the acceptance of local quality and technology supervision department at the provincial level or State Quality inspection Bureau.

If the candidate fails to pass the application, it must apply for it within one year, according to Accreditation criteria on special equipment inspection agencies.

(Accreditation criteria on special equipment inspection agencies TSG

Z7001-2004, Chapter 3, No.11, 3, referred to 2012/03/12)

Candidate submits the application materials to local quality and technology supervision department at the provincial level or State Quality inspection Bureau, they will send an acceptance notice to the candidate, and the process comes to the judgment process. In the judgment, the supervision department will inform the candidates who fail in the application to complete the application materials. Also, supervision department will notice the candidate who successfully passes the acceptance.

In examine and approval process, if the supervision department finds any doubt on the application, it can send the people to check out in the place of candidate.

(Accreditation criteria on special equipment inspection agencies TSG Z7001-2004, Chapter 3, No. 17, 3, referred to 2012/03/12)

If all the processes are passed, the State Quality inspection Bureau will issue the certificate.

4.1.2 Legal requirement of elevator inspection office establishment

According to the Accreditation criteria on special equipment inspection agencies, to establish an elevator inspection office the candidate needs:

- ◆ Fixed assess no less than 1 million RMB, value of inspection equipment no less than 500 thousand RMB.
- ◆ 1) One elevator inspector, 2) Three elevator checker, 3) one electronic technology manager, 4) one II level ultrasound checker, one magnetic

particle checker

- ◆ Building area of not less than 200m² fixed office field, Use area of not less than 10m² of archives, library reference room
- ◆ Dedicated equipment room
- ◆ Every checker have at least one computer and suitable software
- ◆ Has to assume inspection responsibility for negligence of the debts (not less than 3 million RMB

(Accreditation criteria on special equipment inspection agencies TSG Z7001-2004, enclosure B2, referred to 2012/03/12)

The candidate must meet the requirement and submit the application form with the materials which mentioned in the general legal requirement to the state department and go through the application process.

If all requirements are achieved, state department will issue certificate within 30 days since application. (Accreditation criteria on special equipment inspection agencies TSG Z7001-2004, chapter 3, No. 19, referred to 2012/0312)

With the issued certificate, candidates are able to perform elevator inspections in specific area.

4.1.3 Working conditions of staff

According to the legal requirement of elevator inspection office establishment, one elevator inspector and three elevator checker are the most important employees and compulsory requirement to establish elevator inspection office.

According to the Regulation on safety supervision of special equipment legislation of No.39. all types of special equipment's inspection people and management people should be qualified and obtain the special equipment personnel certificate. (Regulation on safety supervision of special equipment, No.19, referred to 2012/03/12)

And according to the Special equipment operation legislation of No. 6, examination and certification work of special equipment inspection people is taken responsibility of Quality inspection Bureau. (Special equipment operation, No.6, referred to 2012/03/12)

Also, according to Boiler and Pressure Vessel and Pressure Piping and Special Equipment Inspection staff appraisal rules legislation of No. 12, the elevator checker application conditions are (meet anyone of it)

- ◆ Above the electronic college degree or safety engineering assistant qualification and in elevator design work 、manufactory、service、inspection for more than one year.
- ◆ Above the electronic secondary degree、 science and engineering college degree or safety engineering technician qualification and in elevator design work 、 manufactory、 service、 inspection for more than two year
- ◆ Above science and engineering secondary degree and in elevator design work 、 manufactory、 service、 inspection for more than three year.

(Boiler and Pressure Vessel and Pressure Piping and Special Equipment Inspection staff appraisal rules, No. 12, referred to 2012/03/12)

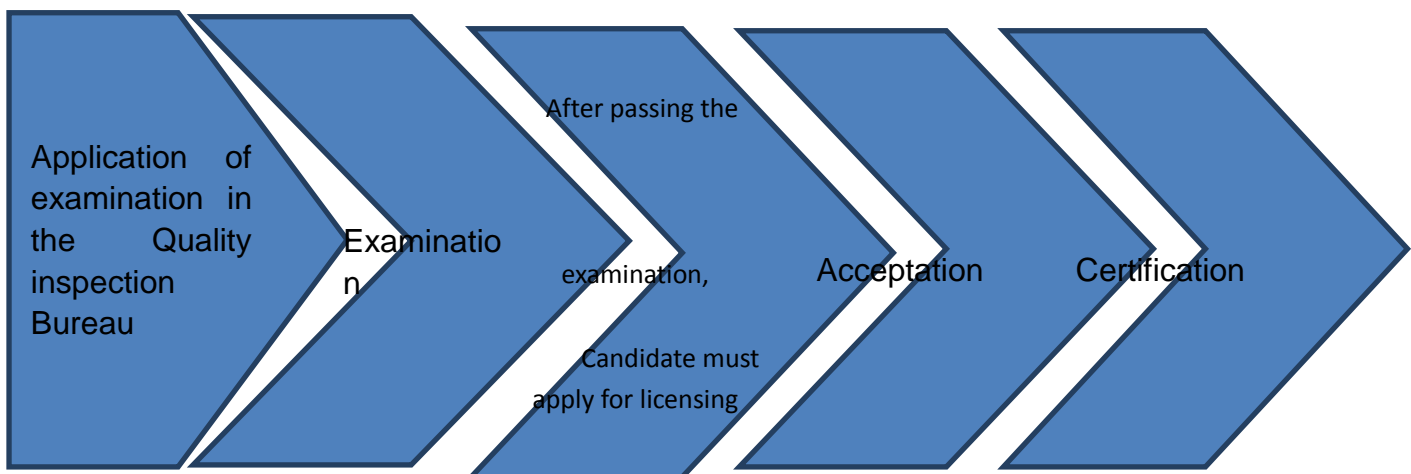
According to Boiler and Pressure Vessel and Pressure Piping and Special Equipment Inspection staff appraisal rules legislation of No.17, the elevator inspector application conditions is:

- ◆ Obtained the qualification of elevator checker with engineer qualification and in the working of inspection for more than three years.

(Boiler and Pressure Vessel and Pressure Piping and Special Equipment Inspection staff appraisal rules, No. 17, referred to 2012/03/12)

To obtain the qualifications, the candidate needs to pass the exam in the supervision department. The all processes is describe in the table below:

Table 4. The process of certification



(Guide to Deyang Quality inspection Bureau, Sichuan, China, p32)

4.2 Economic Findings

From economic perspectives, I will explain whether this market is growing in the city of Deyang and describe the economic environment of this market. In addition, this research will help to find target customer of the market and the income of the elevator inspection office. Thus, according to all the information I collected the cost of establishing an elevator company could be basically calculated.

4.2.1 Basic introduce to the economic situation of Deyang

As it mentioned previously, Deyang is located in the northeast of Sichuan province, and the GDP of Deyang achieved 112 billion RMB in 2011.

Deyang is growing very fast, since 2011, the number of companies whose annual output exceed 5 million are more than 1040 in Deyang. The GDP of Deyang achieved 113.75 billion RMB, with the growth of 15.6% compare to the last year, investment in fixed assets is 65 billion, with the growth of 8.7% compare to the last year. Fiscal revenue of Deyang government is 25.8 billion, with the growth of 38.1% compare to the last year. The total foreign trade value achieved the second rank in Sichuan province with 2.9 billion dollar. Average Per capital disposable real income of urban resident achieved 20 thousand Yuan, and average real income of peasant achieved 7831 Yuan. (baike.baidu.com, online, referred to 2012/3/19) Under such a quick economic growth environment, the number of elevator could increase in the future. The elevator inspection market has a big market potential in Deyang city.

For more growth information about the city, I am still looking for it; it is hard to gather very precisely information by myself. And the real growth of the city is very quick and hard to dig the information from the website.

4.2.2 Key customer

The types of the elevator show below:

Figure 1 Types of elevator

Name	Characteristic
Passenger elevator (TK)	For carrying passengers
Goods elevator (TH)	Mainly for delivering goods
Goods and passenger elevator (TL)	This kinds of elevator is able to carrying passengers and also able to deliver goods
Hospital elevator (TB)	For delivering hospital bed and hospital equipment. Nominal load capacity is 1600kg and 200kg
Residential elevator (TZ)	For residential buildings nominal load capacity is 320kg and 400kg
Panoramic elevator (TG)	Transparent cover
Ship elevator (TC)	Elevator use in the ship
Vehicle elevator (TQ)	For delivering vehicles.
Building operation elevator	Including building operation and service elevator

(Training material for elevator checker、service、management people, p4, 2012/3/19)

Anyone, no matter private person, company, hospital or other organizations, who own elevators that showed in the types of elevator is the key customer to the elevator inspection office. The key customer for elevator inspection office is company owner, especially the manufactory company, because they own the largest number of elevator.

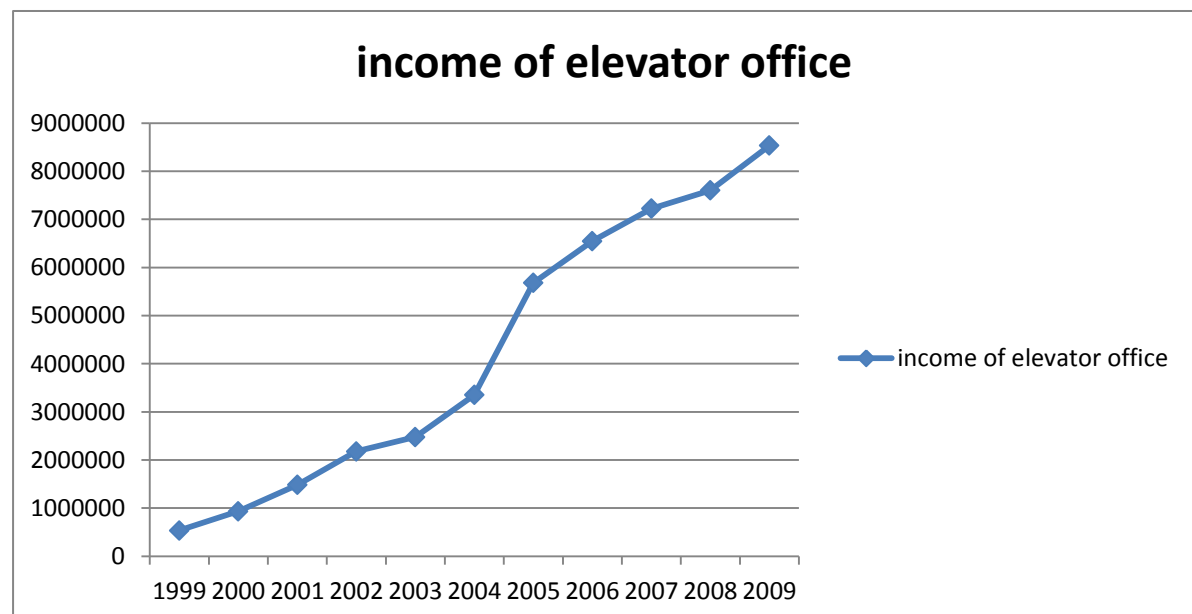
4.2.3 Market growth

With the development of construction of city infrastructure, many contemporary

buildings are built; also the elevator apartments are wildly constructed over the city because of the growing demand for the apartment. Elevator apartment is a kind of private apartment that with average twenty floor and mainly use elevator to climb. The population is growing, and the area of the city is limited, so more and more urban resident are built by the style of elevator apartment, to cover the quickly increasing population and to meet the demand of the residential customer. Also, to meet the high service demand of customer, for a better and comfortable life living in the high buildings, elevators are used to meet the desire of energy-saving of people. Elevator is the most common tools for climbing especially in the high buildings.

The growth of elevator is quick nowadays in Deyang city. The figure shows the rapid growth of income of elevator inspection service:

Figure 2 Income of elevator office



(Internal file, referred to 2012/03/20)

From the figure 2 we can obviously see that the income of the elevator inspection office keeps in a rapidly growth since 1999. The inspection fee of charge does not change at all, so the only reason cause the income growth of elevator inspection office is the increasing number of elevator inside the city.

So from other side of perspective, we can see the growth of elevator number in Deyang city from 1999 to 2009. In 1999, there were only 221 elevators in the Deyang city, in 2009, there were 831 elevators in the Deyang city. (Internal file, referred to 2012/03/12) The number of elevator is roughly four times more than it sued to be in 1999, compare to 2009. And it is keep growing nowadays. The number of elevator in Deyang city is 1259 in 2011; it is roughly six time bigger compare to the number in 1999. The annual growth rate of elevator is 30%, since 2006. (Z Liu, interview with the director of elevator inspection office, 14 May, 2012)

The exactly number of elevator in Deyang city is very difficult to ensure, because the number of elevator keeps increasing, and people are not able to know the customer who is using a new elevator a new elevator as soon as he buy it. But the number of elevator registered in the Quality inspection Bureau is 831 in 2009. (Internal file, referred to 2012/03/20)

4.2.4 Basic thinking and analysis of income and cost

There are two different kinds of elevator inspection service provided. The first one is acceptance testing. And the second one is periodical inspection. The first service is provided when the elevator owner installing the elevator in the building. The elevator owner must buy an installation service from a qualified installation company and apply for the acceptance testing to the elevator inspection office. Office will send people to the place where elevator is installing when it starts to install elevators. If the elevator owner pass the acceptance testing, elevator inspection office will give the certificate to the elevator user, and according to the Elevator safety management, elevator owner must bring elevator factory data and acceptance test certificate to the

Special equipment supervision department of Quality inspection bureau to apply for registration 30 days before elevator put in use.. (Training material for elevator checker、 service、 management people, p287, referred to 2012/3/21)

The second one is periodical inspection. Every elevator must be checked at least once a year... It means that the elevator owner must apply for the periodical inspection before the last inspection validity expired. The elevator inspection office will send usually two elevator checkers to the owner's place to check the elevator and record the figure. If it is still in the good condition, the elevator inspection office will give a one year safety certificate to the elevator user. And the elevator owner still needs to apply for the periodical inspection next year.

The periodical inspection charging standard is showing below:

Figure 3 Charging standard of elevator

Type	Charging standard	Remark
Passenger and goods elevator	550Yuan/ one	Above five floor, every one floor for 10% extra
Hospital elevator	500Yuan/ one	Above five floor, every one floor for 10% extra
Building operation elevator and other elevator	400 Yuan/ one	

The acceptance testing charging standard is 150% of periodical inspection charging standard.

(Price Bureau of Sichuan Province, Sichuan Province, Department of Finance Letter on the special equipment inspection fees, referred to 2012/3/21)

There are around 1000 elevator in the Deyang city, and the average charging price is $(550+500+400)/3=483$. The real number of different type of elevator in city is unknown. So the hypothetic income of periodical inspection service is 483,000 Yuan. And the acceptance testing hypothetic income is 724500. So the total annual income is 1187500.

And based on the legal requirement of elevator inspection office establishment, we can see that the asset cost is 2 million, and the people recruited number is seven. So the cost compare to the income is quit few, but I still need to work on it very precisely. I need to gather many other information like the rents of building, human resource cost, and equipment cost and so on.

4.3 Social findings

In the social findings, it explains how customer behaves in the process of buying and reacts to the service.

4.3.1 Customer attitude

In a normal market strategy, customer's attitude on the product will be put much research and attention. And the company focus on how to attract the customer in different means, such as, advertising、promotion、package , try to make customer have a glimpse on the product. But the customers which elevator inspection office are facing are totally different.

In addition, elevator owner must apply for the periodical inspection in the elevator inspection office 30 days before validity of inspection certificate

expired. (Regulation on safety supervision of Special equipment, chapter 3, No.28)

From the legislation above we can see that the elevator user, the customer must apply for the inspection from the elevator inspection office by themselves. Therefore, it will encourage the customer to apply for the inspection voluntarily because the safety problem of the elevator has been taken into more and consideration. And obviously, this is the most important part of reason that they have to go the elevator inspection office to apply for the inspection service. A safety certificate will make these customers satisfied. They obey it, besides, it is the state law, if they do not do it, they break the law, and according to the Regulation on safety supervision of Special equipment,, the use of uninspected or unqualified elevator will cause two thousand to twenty thousand RMB punishment.(Regulation for lift supervisory inspection and periodical inspection TSG T7001-2009, chapter 7, No. 83)

4.3.2 Customer buying process

From section 4.3.1 and analysis of income and cost part we know there is two services that elevator user, customer, can buy from the elevator inspection office. But totally different from the normal buying process of goods in the daily life, elevator inspection service is very complex and compulsory to the normal commercial perspective.

From the elevator user perspective, he or she first buys the elevator from the elevator manufactory. It is not directly move the elevator to the buyer's place. Elevator owner needs to find a contract commissioned elevator installing company to install elevator, this is the second step.

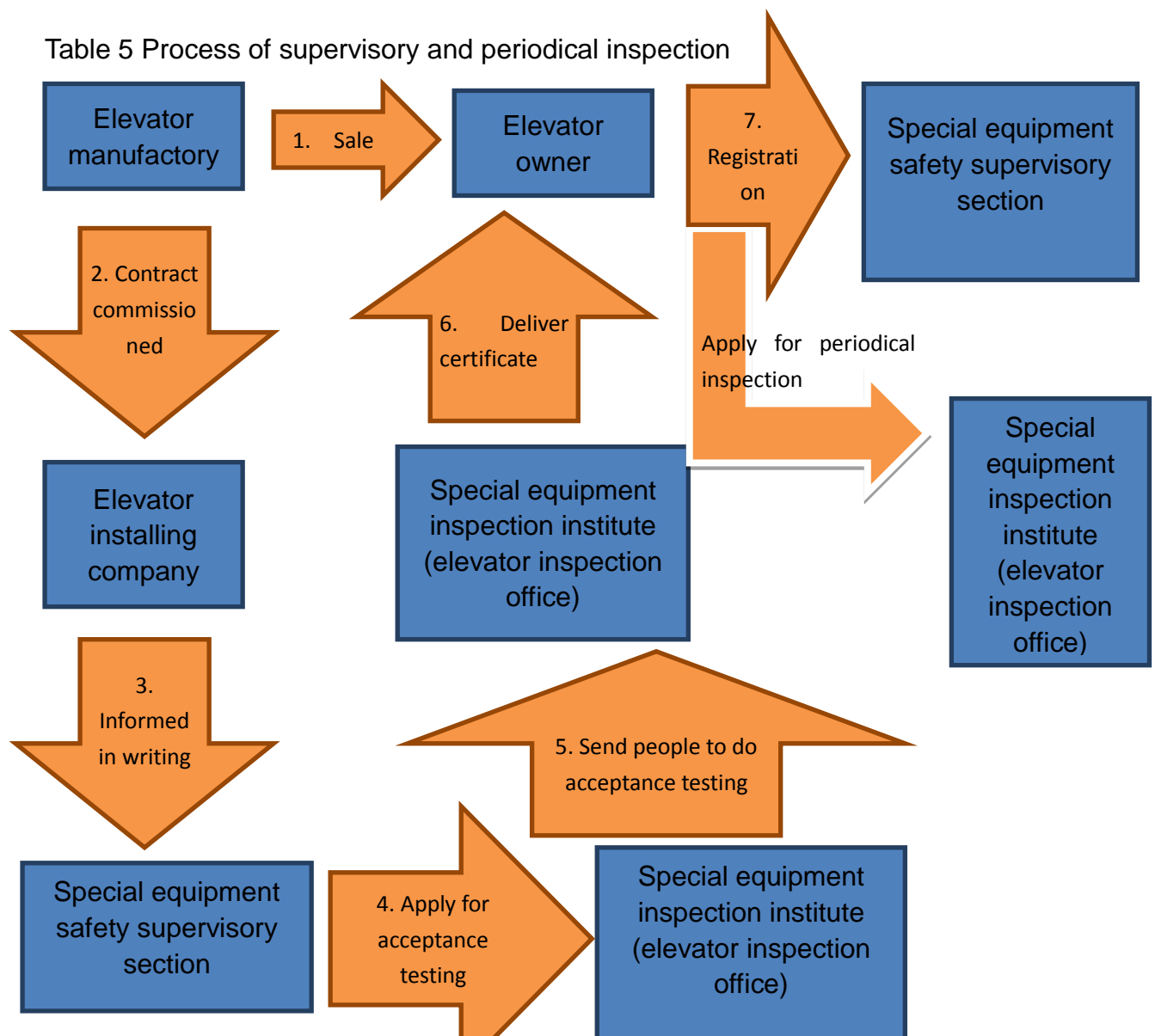
In the later step, elevator installing company should inform the special equipment safety supervisory section in written notice. And meanwhile, elevator installing company should make the application of acceptance testing.

(Z Liu, interview with the director of elevator inspection office, 14 May, 2012)

From elevator inspection institute, this is fourth step. Under the supervisory of elevator inspection office, elevator installing company installs the elevator for the elevator owner.

If all the installing processes are qualified and safety, elevator inspection office should keep the record figures and send both instating figures and the certificate to the elevator owner, this is the sixth step. In the seventh step, elevator user shall bring both installing figures and certificate to register in the Special equipment supervisory section.

Table 5 Process of supervisory and periodical inspection



After successfully registered and installed elevator, elevator can be put into use. And every year, in the most common situations, the elevator owner has to make the application of periodical inspection in special equipment inspection institute. (Z Liu, interview with the director of elevator inspection office, 14 May, 2012) Any unqualified figures or unsafely condition of elevator will cause forbidden use of elevator until it shows the stable and safely figures.

4.3.3 Life style trend

Nowadays, the life in the Deyang city is more and more technologically. The number of elevator apartment is growing, the exactly number is what I should still and continually work on, and the life there is more and more elevator dependent. But I did not do any research on the life style of Deyang city. I think this part of analysis is very important to my plan in the future.

4.4 Technology findings

4.4.1 Dependent technology

The work of inspection is mainly taken responsibility by the elevator checker. There are two ways of inspection. The first one is self-inspection. It is mainly recorded by the elevator owner itself. The record will make in writings and send to elevator inspection office no matter it is self-inspection of periodical inspection or acceptance testing, they all need elevator owner to do the self-inspection. Based on the record figure, inspection checker will check the figures and the decision will be made by elevator examiner if this elevator

needs on-site inspection, the second way of inspection. Elevator inspection office will send at least two elevator checkers to do the on-site inspection (Regulation for lift supervisory inspection and periodical inspection TSG T7001-2009, chapter 3, referred to 2012/3/21)

The mainly required equipment in the on-site inspection are showed below:

Table 6 Equipment requirement of elevator inspection office

Name	Number
2. Wire rope flaw detector	At least one
3. Portable ultrasonic flaw detector	At least one
4. Portable magnetic particle detector	At least one
5. Acceleration and deceleration measurement device	At least one
6. Speed limiter test instrument	At least one
7. Common electrical tools	
8. Explosion-proof equipment	

(Accreditation criteria on special equipment inspection agencies TSG Z7001 2004, enclosure B2, referred to 2012/03/20)

In the on-site inspection, elevator checkers will use different equipment to measure or check the condition of the elevator and record the figures.

4.4.2 Technology legislations

Besides the qualification of elevator inspection checker, the way of checking and measurement must be based on the inspection legislation of TSG T7001-2009.

According to the regulation for lift supervisory inspection and periodical inspection, TSG T7001-2009 should apply in the elevator installing、transform、maintenance of supervisory inspection and periodical inspection。

(Regulation for lift supervisory inspection and periodical inspection TSG T7001-2009, chapter 1, No. 2, referred to 2012/03/20)

All the ways of measurement and checking are under the TSG T7001-2009. It means that every detail way of measurement can be found in the TSG T7001-2009 and it all subjective to the TSG T7001-2009.

4.5 Characteristics

It is an entire new market in China. From the secondary data analysis I find two main characteristics of elevator inspection market in Deyang city. They are the scattered distribution of customer in Deyang city, the largest elevator owner in Deyang city and largest company owners.

Figure 4 Original list of elevator owner and number of elevator owning

2009 年中江电梯检验时间表

序号	使用单位	检验时间	台数
1	中江县中医院	2009 年 3 月 25 日上午	1 台
2	中江人民医院	2009 年 3 月 18 日上午	5 台
3	中江美好家园商贸有限公司	2009 年 3 月 27 日上午	3 台
4	德阳金安物业管理有限公司	2009 年 29 日-31 日上午	16 台
5	中江县金泉物业服务有限公司	2009 年 3 月 31 日上午	3 台
6	中江县人民政府行政服务中心	2009 年 4 月 30 日上午	1 台
7	四川省中江县职业中专学校	2009 年 5 月 15 日上午	1 台
8	中江县继光实验学校	2009 年 5 月 15 日上午	1 台
9	中江环球大酒店	2009 年 6 月 19 日上午	1 台
10	中江三九药业	2009 年 7 月 31 日上午	5 台
11	中江腾龙实业	2009 年 8 月 7 日上午	1 台
12	中江县新太平洋服饰店	2009 年 8 月 11 日上午	2 台
13	佛兰印刷	2009 年 10 月 12 日上午	2 台
14	中江花园饭店	2009 年 10 月 12 日上午	1 台
15	中江粮贸大厦	2009 年 10 月 13 日上午	2 台
16	中江新伍城大酒店	2009 年 10 月 13 日上午	3 台
17	中江电信公司中江分公司	2009 年 10 月 14 日上午	2 台
18	中江逢春药业有限公司	2009 年 10 月 14 日上午	2 台
19	中江奉献酒楼	2009 年 10 月 15 日上午	1 台

(Internal file, referred to 2012/3/26)

This is the original figure of elevator population distribution in Zhongjian country, Deyang city. (Zhongjian country is under administration of Deyang city, belongs to Deyang city) The whole number of elevator owner is 241 from the original figure I can access in the elevator inspection office.. This figure mainly provides the information of inspection schedule. Aside the exactly inspection date, we can get the information of elevator distribution in Zhongjiang country I take 120 sample from the original source above. The whole number of owner is 120, and the elevators owned are 279 in total. It partly shows: below, the whole sample attached in the reference part.

Figure 5 translate of figure 4

Serial number	User name	Number of elevator
1	Maternal and child care service Centre	1
2	Deyang Mor company	8
3	Sichuan judicial officer professional college	4
4	Deyang hospital	14
5	Gang wan residential village	2
6	Sichuan Jing xing comapny	1
7	The second geography prospecting brigade	1
8	Tian di restaurant	1
9	Sichuan Zhuang jin Branch company	1
10	Deyang Ya xuan camellia	1

(Part translation of internal file, referred to 2012/3/26)

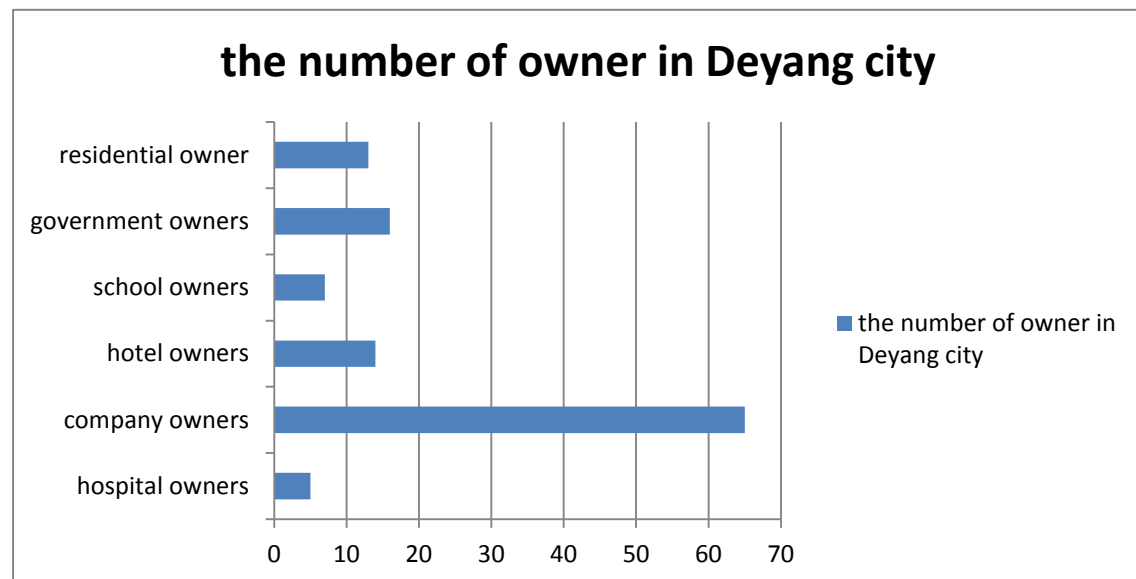
There are two sub-characteristic of scattered distribution, they are user specie scattered distribution and location scattered distribution. Based on this part figure of elevator distribution, I will analyze these three sub-characteristics by using quantitative methods.

4.5.1 Owner type scattered distribution and location scattered distribution

From the 120 sample above, I can get the figure that there are five hospital owners, sixty five company owners, fourteen hotel owners, seven school owners and sixteen government owners and thirteen residential owners

The figure is showing below:

Figure 6 The number of owner in Deyang city



From the figure we can obviously see there is no trend or regular pattern in the distribution of owner. Owners can be anyone who own elevator, school, company, government, hotel, residential or hospital. So the owner can be anyone in the Deyang city, not only company、hospital、government、school and hotel, but also other owners who use the elevator in the daily life. It reveals that the elevator owner can be anyone who is owning the elevator.

And from the figure we can obviously see that company owners are the largest owner in the Deyang city.

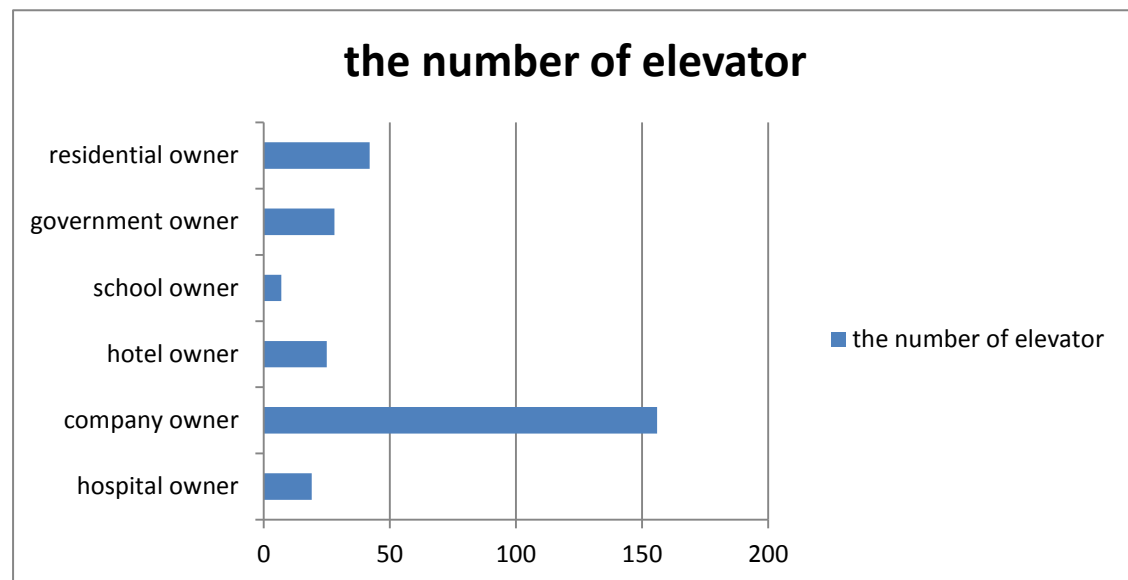
For the location scattered distribution, I need to find more information about the location of the elevator owner. It needs deeper and wilder work on the elevator inspection market in the future time. But no need for any information

on the real location of these users, just based on common sense, the users can located in anywhere of Deyang city. It is a very important part which concerns on the logistic thinking in the future time.

4.5.2 The largest number of elevator in use in Deyang city

Also, different owner has different number of elevator; we can also see it very clearly in the figure 7. Hospital owners have nineteen elevators, company owners have one hundred and fifty six elevators, hotel owners have twenty five elevators, school owners have seven elevators, government owners have twenty eight elevators and residential owners have forty two elevators, in total two hundred and seventy nine elevators in one hundred and twenty samples.

Figure 7 The number of elevator among the different owner

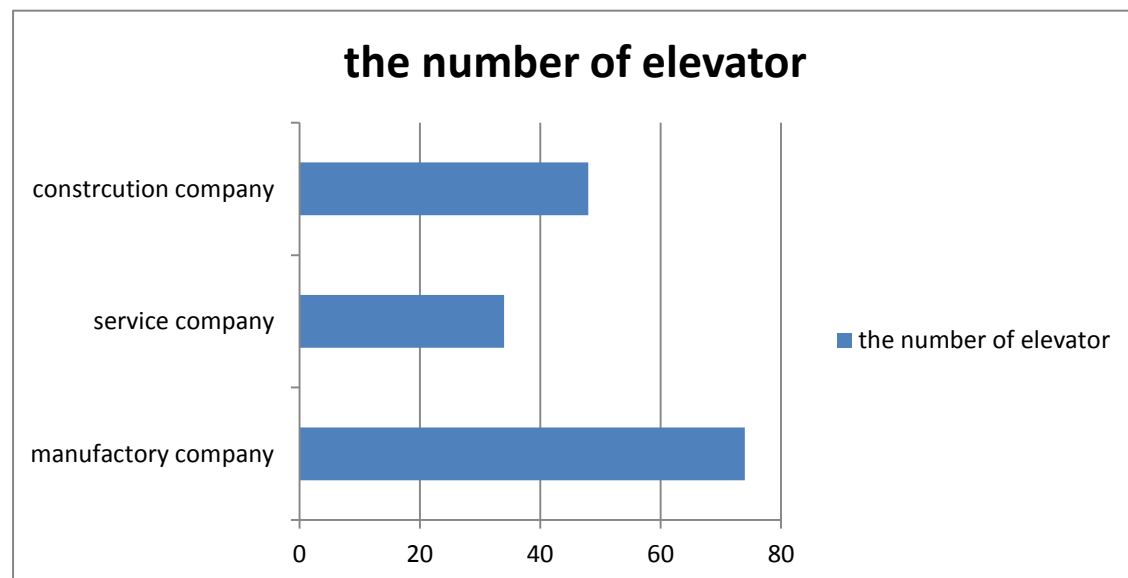


From the figure we can see that the number of elevator of Company owner is much higher than any other owners in Deyang city. It could help on the advertising or after-sale service in the future . Like company owner is the key customer to the elevator inspection company, company shall make the most

suitable strategy on it.

I also divide the company into three parts: Manufactory Company, Service Company and Construction Company. Manufactory company has seventy four elevators, service company has thirty four elevators, construction company has forty eight elevators.

Figure 8 the number of elevator among different company



From the figure, the manufactory company owns the largest number of elevator.

5 conclusion

Elevator inspection market is very attractive for me although it is under supervisory of government. Just as it says “never turn idea into ideology”, so I do not want to see this plan only stay in my mind, so I work on it, and analyze it, hope this thesis helps me have a deeper understand of elevator market and have a prepare thinking of elevator inspection market in the future time.

Elevator inspection market is very high value market, from the legal requirement of elevator inspection office establishment the cost of establishment is quite low compare to the income of the elevator inspection from the economic part. In other word, the profit rate of elevator inspection market is very high. Based on the hypothetic thinking of one thousand elevators in Deyang city, the real income within one year could be more than one million Yuan. The profit rate is almost 50%, if the cost is two million. Also, it has the very attractive factor to me; it is the compulsory service for the customer under the legislation of People’s Republic of China. Very uniqueness from any other normal service market, this requirement means a long-term and stable customer in Deyang city. In addition, this market is growing quickly based on the finding of Economic. It achieves almost a ten times increase compare to the figure ten years ago, and it is still in the quick growth in Deyang city. Although the population of Deyang city is a little bit decrease recently, elevator inspection market keeps an increasing trend. This means a big potential in the elevator inspection market in the future, even though it has a very complicate establishment process and very strict establishment legal requirement.

Also, the elevator inspection market is a very technology dependent market. The complex and difficult working conditions for the elevator inspection and the

critical examination standard of inspection process requires certified people with technological background. And the high standard requirement of technology makes the elevator checker and examiner a real rare and difficult career in the real life. For the future thinking, the recruitment of elevator checker and examiner should be put in the first priority, because not any real elevator inspection work needs them but also the legislation of elevator inspection office establishment requires certain number of elevator checker and examiner in the office.

The clear process in the social findings gives me a confident understanding of elevator inspection market. it makes me know how this market function in the Deyang city. It gives me the picture of real market buying process, helps me have a basic picture of elevator inspection market value chain in my mind.

The pest analysis provides me a very good outline of market description to have a better view of elevator inspection market. But there are still many things I need to consider and make a deeper exploration in the future time. For the legal requirement, the legal requirement of elevator inspection office establishment is not enough for the real company establishment; it involves many other legal requirements in the real world. More legislation is required. Like the company law, labor law ,

The information about Deyang city is very basic and normal, more information is needed. Because it concerns the thinking of cost, what is the real income in Deyang city, what is the consume level in Deyang city, what is the transportation level in Deyang city and many other relative questions need to think. It all relate to the cost thinking. And the cost analysis is very simple In this thesis, it cannot meet the requirement of real consider of elevator inspection office establishment. Cost of recruitment 、 office rent 、

transportation fees、equipment、salaries and tax rate, very precisely and carefully calculation is required on the real cost.

For the future consideration, life trend shall be check again carefully in the Deyang city. Any negative change on the life trend could affect the potential of elevator inspection market.

All in all, elevator inspection market is very attractive for me. I will keep working on it and wait for it. All the analysis and finds above are all based on the contemporary legislation and conditions. Anything could happen in the future time, I just do my best to prepare and wait.

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Appendix

Translated figure of one hundred twenty samples

Serial number	User name	Number of elevator
1	Maternal and child care service Centre	1
2	Deyang Mor company	8
3	Sichuan judicial officer professional college	4
4	Deyang hospital	14
5	Gang wan residential village	2
6	Sichuan Jing xing comapny	1
7	The second geography prospecting brigade	1
8	Tian di restaurant	1
9	Sichuan Zhuang jin Branch company	1
10	Deyang Ya xuan camellia	1
11	Deyang eyes hospital	2
12	Chang fu residential village	2
13	Shi ji residential village	2
14	Dianxin residential village	3
15	Business building	5
16	Fifth hospital	2

17	China people insurance company	1
18	Deyang lian fang company	1
19	Ya residential village	1
20	Deyang Industrial and commercial bureau	2
21	Tian yun hotel	1
22	Jia mu company	5
23	Hai pu company	1
24	Purchasing company	1
25	Libao dressing center	1
26	China renshou insurance company	2
27	Er zhong marketing company	2
28	Dong fang cinema	2
29	China mobile	1
30	Mao yuan company	1
31	Sichuan technology college	2
32	Weida paper company	1
33	Deyang scientific company	3
34	Jing yang hotel	1
35	Sichuan special material company	3
36	Deyang new time management company	6

37	Deyang jueshi coffee shop	1
38	Sichuan lichuang residential village	3
39	Boling company	1
40	Deyang shiji lian hua super market	4
41	Sichuan Deyang Revenue bureau	2
42	Deyang Four seasons hotel	2
43	Special material company of Angang	1
44	Sichuan tobacco company Deyang branch	1
45	Deyang jiaqijnjia company	2
46	Deyang jingyang eyes hoepital	1
47	Deyang government center service center	3
48	Deyang Huaxi management company	5
49	Deyang hexie hotel	1
50	Deyang teaHaus	1
51	Zuo an Ban dao	2
52	Deyang avery	1

	residential management company	
53	Deyang diseases center	1
54	HAN HAN hotel	3
55	Deyang chengping furniture center	1
56	Deyang kangyun health	1
57	Deyang chengqi group	4
58	Deyang kangjian	2
59	Deyang xinming residential company	7
60	Deyang ICBC	3
61	Deyang tenghui warehouse	1
62	Yingjie electronic	3
63	Deyang construction bureau	1
64	Sichuan Meifeng	1
65	China oil company Deyang branch	1
66	Deyang shopping center	3
67	An hua hotel	1
68	Deyang science bureau	1
69	Deyang post bureau	1
70	Deyang police bureau	3
71	DONGqi zikong	1
72	Deyang government	4
73	Wencang hotel	1
74	China mobile	1

75	Sichuan company	Pangu	1
76	Deyang institute	research	2
77	Jinghu hotel		5
78	Wal-Mart		16
79	China Dianxin		3
80	Diao dressing company		1
81	Deyan bureau	national tax	1
82	Wuzi building		1
83	TAN food center		1
84	Xinrui hotel		1
85	YANG YANG center	shopping	10
86	Jinlu company		2
87	Deyang school	forth primary	1
88	Erzhong company	elevator	1
89	Pacific hotel	international	6
90	Deyang audit bureau		1
91	Deyang taigu company		1
92	ZHENG SHUI		3
93	JingXi hotel		1
94	HUILE residential village		2
95	ZHONGGU Lou		1
96	Light hotel		2

97	Deyang national security bureau	1
98	HUA building	3
99	BOBO residential village	2
100	Deyang committee	2
101	Deyang HUA GONG plant	1
102	Deyang post office	1
103	HUA SHAN building	2
104	Zhong building	2
105	Deyang caihe company	3
106	Deyang Laite hotel	2
107	Sichuan construction college	1
108	Deyang gongchuang company	1
109	Nan hu residential village	4
110	Ya yuan residential village	1
111	Fukang company	2
112	Sheng tai residential village	2
113	Deyang disable people service center	1
114	Hushui residential village	5
115	Jing hu residential village	7

116	Rainbow residential village	2
117	Electronic bureau	2
118	Dong Fang electronic	3
119	Dong dian hotel	1
120	Zhong shihua company	2

25 minutes Interviews taken on 14, May, 2012, director of elevator inspection office was interviewed

The structure interview questions:

1. What is special equipment? And what consist of special equipment?
2. What is the organizational structure of Quality inspection bureau?
3. What is the organizational structure of elevator inspection office in quality inspection bureau?
4. What is the responsibility of elevator inspection office?
5. What kind of service elevator inspection office provide? And what is the charging standard?
6. Is there any technology requirement on elevator inspection? And what is it?
7. Does the employee of elevator inspection office need any certificate? If it is needed, what is it?

The answer to the questions partly recorded from the interview:

1. What is special equipment? And what consist of special equipment?

Answer: special equipment means any equipment mentioned in the laws of f Accreditation criteria on special equipment inspection agencies is special equipment.....It consists of eight kinds of special equipment nowadays in China. They are boiler, pressure vassal, pipeline, elevator, crane, in-plant vehicle; thrill rides and gas cylinder.

2. What is the organizational structure of Quality inspection bureau?

Answer: it is part of Chinese government.....it is under the vertical management of Chinese government. For example, the Deyang city Quality inspection Bureau under the management of Sichuan Province Quality inspection Bureau, and the Sichuan province Quality inspection Bureau un der the management of national Quality inspection Bureau.....talking about the internal organizational structure of Quality inspection Bureau, It consist of ten sections inside the Deyang Quality inspection Bureau and Four institutes. They are

3. What is organizational structure of elevator inspection office in Quality inspection Bureau?

Answer: elevator inspection office is part of one institute of Quality inspection bureau not part of section.....there is an equal level of institute and section. Each section has a same level institute.....like special equipment section has a same level institute, the special equipment institute which elevator inspection office belongs to.....sections responsible for the registration and application.....and institute like special equipment institute responsible for

the real inspection for elevator.....like there are inspection people, the checker, examiner in the special equipment institute while there is only officers in special equipment section (Joking).....but they are in the same political level, the same position between my boss and boss of section.....in the special equipment inspection institute, there are eight special equipment inspection office, each of them responsible for each of eight special equipment, we are one of them.....

4. What is the responsibility of elevator inspection office?

Answer: well, we responsible for the safety use of elevator.....the different species of elevator you have already known....single callings happen every day, for them we just send checkers to do some normal checking like what you did.....of course the elevator need periodical checking so that's why we provide periodical inspection for the registered elevator in the whole Deyang city.....also there is supervisory inspection, that is what you have already known in the working time here.....

5. What kind of service elevator inspection office provide? And what is the charging standard?

Answer: the kind of service I just answer you previously.....For the charging standard you'd better check from Price Bureau of Sichuan Province,.....basically I can tell you is it depends on the species, and flour that elevator reach.....the income of the office increase fast, at about annual increasing rate is almost 30% nowadays.....the number of elevator increases fast....in 1999, the number is 221, it increases very slow in the beginning, but it begins to increases rapidly in 2006.....564 elevator at that time, then annual growth rate keeps at about 30% since 2006.....now the total number of elevator is 1259.....

6. Is there any technology requirement on elevator inspection? And what is it?

Answer: of course our checking process subjects to Laws of Regulation for lift supervisory inspection and periodical inspection.....most of.....we also have some kind of management laws.....technology just subject Laws of Regulation for lift supervisory inspection and periodical inspection....and of course we shall responsible for the result of mistaken inspection.....

7. Does the employee of elevator inspection office need any certificate? If it is needed, what is it?

Answer: of course they do.....like me.....i have the certificate of elevator inspection inspector.....it takes a long time to get.....you should first worked as an elevator assistant for at least three year if I remember correctly...taken the examination of elevator check...that is the first, following is the working experience needed to apply for the examination of elevator inspector.....it needs at least three year again to gain the enough experience....i am the only one who get the certificate of elevator inspector in the office....two of them are elevator checkers and the rest of people is just electronic management people....so in the elevator inspection office, it needs at least one elevator inspection examiner and two elevator checkers...and some other employee who do not needs certificate.....